REMARKS

Status of the Claims

Claims 1, 2, and 8 – 9 are pending. Claims 3 – 7 and 10 – 11 have been canceled.

Claim Amendments

The broadening amendment to claim 1 does not add new matter, because the amendment is supported in the specification on page 8, line 1. Additionally, entry of the amendment to claim 1 would not require further examination or search, because the upper limit of 65 wt % for the carbon fillers has already been searched and examined. Furthermore, the amendment to claim 1 puts the application in clear condition for allowance.

Claim Rejections

I. The Office action rejects claims 1, 2, 8, and 9, citing 35 U.S.C §112, second paragraph.

Applicants request reconsideration in view of the amendment to the claims.

II. The Office action rejects claims 1, 2, 8, and 9, citing 35 U.S.C §103(a); EP 1 011 164 to Saito et al. (hereinafter, "Saito"); US 6,331,586 to Thielen et al. (hereinafter, "Thielen"); and JP 2002-097375 to Shigeru et al. (hereinafter, "Shigeru").

Saito relates to a separator for fuel cells formed using a base material obtained from a composition comprising a binder, a powdery carbon filler, and a short fiber. The powdery carbon filler is present in an amount of from 200 to 800 parts by weight per 100 parts by weight of the binder. The short fiber is present in an amount of from 10 to 300 parts by weight per 100 parts by weight of the binder. Thus, according to Saito, the

powdery carbon filler and the short fiber together comprise a minimum of 67.7 % by weight of the overall base material.

As acknowledged in the Office action Saito does not describe a binder comprising at least two mutually nonmiscible blend polymers in a co-continuous or intercalated structure. The Office action cites Thielen as teaching such a binder. However, a combination of Saito and Thielen would not have been obvious, because Thielen explains:

- "[A]s the concentration of carbon black [in a polymer or polymer blend] increases, the mechanical properties of the composite tend to deteriorate. The toughness and flexibility of the composite decrease, and an article formed from the carbon filled material is undesirably brittle."[1]
- "Another important detrimental effect of the presence of carbon black in plastics is the reduction of the melt fluidity of the thermoplastic polymers, which affects the ease of processability at the transformer level (at the injection molder, extruder, blow molder, thermoforming, etc.)."[2]
- "In view of the above mentioned detrimental effects of the incorporation of carbon black, it is desirable to reduce the amount of carbon black in the polymer composition to improve[] its global product property profile."[3]
- "[E]ven by using super-conductive carbon black, it is not possible to reduce the level of carbon black sufficiently to overcome the problems described above."[4]
- "[A]nother approach in reducing the carbon black loading necessary for imparting conductivity to a polymer has been investigated with specific blends of immiscible polymers which form two co-continuous phases ... in which the carbon black is localized selectively in a continuous polymeric phase, or at the continuous interface between the two co-continuous polymeric phases. ... As

[1] Column 1, lines 36 – 39 of Thielen.
[2] Column 1, lines 49 – 53 of Thielen.
[3] Column 1, lines 58 – 61 of Thielen.
[4] Column 2, lines 16 – 19 of Thielen.

a result of the selective localization, conductivity was attained with a lower carbon black load."[5]

- "Although the mechanical properties of the above co-continuous carbon black loaded-polymer blends are less impaired because the carbon black loading is less than in a single phase polymer matrix, the blending of two such polymers which are not fully miscible and not fully compatible nevertheless results in poorer mechanical properties of the blends, as compared to the mechanical properties of the polymer component in the blend which has the most desirable properties when used by itself.... The reason is that there is poor interfacial adhesion at the phase boundary between the two polymers ...."[6]
- "An object of the invention is to provide conductive polymer blends characterized by at least two co-continuous polymer phases constituted by two polymers which are at least partially immiscible with each other, in which the amount of finely divided conductive material necessary to obtain electrical conductivity is lowered ...."
- "The finely divided conductive material may be other conductive powders, fibers, aggregates or composite particles ... etc. There is no particular limitation on the finely divided conductive material, provided that it does not react chemically with the components of the polymer blend, and can be dispersed in a polymer phase in the blend, or be dispersed at the interface between polymer phases in the blend. ... The finely divided conductive material is selected from materials other than carbon black for applications requiring the polymer blend to be colored to a color other than black."

The Office action alleges that a person having ordinary skill in the art would be motivated to use the co-continuous polymer blend of Thielen in the separator plate of Saito. This allegation is in error.

If the Office action is alleging a skilled artisan would entirely replace the Saito base material with a Thielen composition, then the combination would not meet the compositional requirements of the present invention. Thielen does not employ a polymer

[5] Column 2, lines 20 – 52 of Thielen.
[6] Column 2, line 62 – column 3, line 7 of Thielen.

blend comprising at least one polyamide and at least one polyether ketone or polyether sulfone as blend polymers, wherein the weight ratio, in the polymer blend, of polyamide to polyether ketone/polyether sulfone is from 1:1.6 to 4:1. (As discussed in previous replies none of the references obviate a polymer blend comprising at least one polyamide and at least one polyether ketone or polyether sulfone as blend polymers, let alone a polymer blend with the specific weight ratio required by the claims). Furthermore, the claims require a minimum of 15 wt % of carbon fillers, and it would not have been obvious for a person having ordinary skill in the art to increase the amount of carbon fillers in the Thielen composition, by adding carbon nanotubes, as mentioned in Shigeru, or otherwise. As discussed above, Thielen strongly teaches away from increasing the amount of carbon fillers.

If the Office action is alleging a skilled artisan would replace the Saito binder with at least two co-continuous polymer phases constituted by two polymers, which are at least partially immiscible with each other, as described in Thielen, then the combination would not meet the compositional requirements of the present invention. Again, Thielen does not employ a polymer blend comprising at least one polyamide and at least one polyether ketone or polyether sulfone as blend polymers, wherein the weight ratio, in the polymer blend, of polyamide to polyether ketone/polyether sulfone is from 1:1.6 to 4:1. Moreover, the claims require a maximum of 65 wt. % of carbon fillers, and Saito teaches a minimum of 67.7% of carbon fillers. As discussed above, it would not have been obvious to add carbon nanotubes, because Thielen teaches away from increasing the amount of carbon fillers. Furthermore, adding carbon nanotubes would have pushed the weight percentage of carbon fillers even further away from the presently claimed maximum.

For at least these reasons, applicants request reconsideration of the present rejection.

Fee Authorization

Please charge any shortage in fees due in connection with the filing of this paper, including any shortage in Extension of Time fees, to Deposit Account 14.1437. Please credit any excess fees to such account.

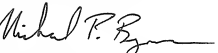
Conclusion

The present application is in condition for allowance, and applicants respectfully request favorable action. In order to facilitate the resolution of any questions, the Examiner is welcome to contact the undersigned by phone.

NOVAK DRUCE + QUIGG, LLP
1300 Eye St. N.W.
Suite 1000 West
Washington, D.C. 20005

Phone: (202) 659-0100
Fax: (202) 659-0105

Respectfully submitted,
NOVAK DRUCE + QUIGG, LLP



Michael P. Byrne
Registration No. 54,015